



Answers to Common Questions About Styrene

What is styrene?

Styrene is a clear, colorless liquid that is a component of materials used to make thousands of everyday products for home, school, work, and play. Styrene is used in everything from food containers and packaging materials to cars, boats, and computers, medical, health, and safety equipment, and even video games. Derived from petroleum and natural gas by-products, styrene helps create thousands of remarkably strong, flexible, and light-weight products, representing a vital part of our health and well-being.

The styrene used in these products is manufactured in petrochemical plants. However, styrene also occurs in the environment and is found in many common foods, such as coffee, strawberries and cinnamon.

Do I come in contact with styrene?

Most people are exposed to styrene every day in tiny amounts that may be present in the air, or that occur in food. These generally are trace amounts, which were difficult to detect until recent technological advances. We also may recognize styrene by its distinctive odor when using certain products such as latexes, paints, and polyester resin solutions.

Some people confuse styrene, which is a liquid, with polystyrene, which is a solid plastic made from polymerized styrene. Styrene and polystyrene are fundamentally different. Polystyrene is inert, and has no smell of styrene. Polystyrene

often is used in applications where hygiene is important, such as health care and food service products. For more information on polystyrene products, visit the [Polystyrene Packaging Council](#) homepage.

Is styrene harmful to my health?

Styrene is not harmful in the very small amounts we sometimes may encounter in air or food. Someone working in an enclosed area with resin solutions containing styrene (patching the surface of a fiberglass boat, for example) may find the odor of styrene causes slight nausea. This goes away with exposure to fresh air, and there is no lasting effect.

In an important decision made in 1994 after an extensive assessment of its possible health and environmental effects, the government agencies Health Canada and Environment Canada concluded that styrene is "non-toxic" for regulatory purposes. After a thorough review of health effects data and evaluation of potential human and environmental exposures, they found styrene "does not constitute a danger to human life and health" and "does not constitute a danger to the environment on which human life depends."

The U.S. Environmental Protection Agency began a formal review of styrene in 1998 for their Integrated Risk Information System (IRIS) database, that will provide an assessment of the scientific data on styrene relative to its potential to impact human health or the environment.

What about the scent of styrene around manufacturing plants?

Styrene's distinctive odor can be detected even when styrene is present at extremely low levels. People living near facilities that make or use styrene sometimes may notice a slight scent of it in the air. If you have concerns about such odors in your neighborhood, contact the plant's manager.

What happens to styrene if it is released into the environment?

Extensive research shows that styrene exists only briefly in the environment; it is rapidly destroyed in the air and disappears quickly from soils and surface waters. Studies also have shown that styrene is not likely to occur in drinking water.

What about the health of workers exposed to styrene?

The health of workers in plants making or using styrene has been monitored for many years. Studies looking for long-term health effects related to styrene exposure have examined health records of over 50,000 workers exposed to styrene, going back nearly 50 years. These studies have not shown any statistically significant increases in long-term health problems of any kind attributable to styrene exposure in these workers.

In the United States, as in most industrialized countries, there are strict regulations protecting worker health. In 1989, the U.S. Occupational Safety and Health Administration (OSHA) established a safe exposure standard for styrene of 50 parts per million (ppm) over an eight-hour day. Typically, the actual exposure levels in styrene manufacturing plants are 20 to 50 times below this safety level. In years past, before effective monitoring systems were available, worker exposure to styrene (as well as other materials) often was greater than current exposure levels.

In July 1992, a U.S. appeals court voided the 1989 OSHA rulemaking, and the pre-1989 level of 100 ppm was reinstated as the enforceable limit. However, the Styrene Information and Research Center (SIRC) encouraged its member companies to continue to comply with the 50 ppm exposure limit. Additionally, several states independently adopted and enforce a 50 ppm exposure limit. In February 1996, OSHA endorsed a styrene industry proposal to voluntarily meet a 50 ppm exposure level. Through a comprehensive educational effort, manufacturing facilities using styrene were advised of

the need to comply with a 50 ppm limit by July 1997. Voluntary compliance by industry can help OSHA avoid the need for another costly and time-consuming review of styrene.

Is there a concern about a risk of cancer?

SIRC has invested many years of effort, and nearly \$12 million in research funding, to develop the most thorough and accurate information about possible cancer effects resulting from styrene exposure. The results of extensive health studies of workers in styrene-related industries collectively show that exposure to styrene does not increase the risk of developing cancer, or any other health effect. Results of a two-year styrene inhalation study in rats, completed in 1996, also showed no increased incidence of cancer.

From a regulatory viewpoint, in 1989, OSHA and its research arm, the National Institute for Occupational Safety and Health (NIOSH), reviewed the health data on styrene and concluded that styrene does not pose any cancer risk. An international panel of experts from the 12-nation European Community reached the same conclusion in 1988. Canada decided in 1994 that styrene posed no carcinogenic risk. A draft 1996 risk assessment of styrene by the Health & Safety Executive of the United Kingdom also concluded that styrene does not pose a carcinogenic threat.

In 1987, the International Agency for Research on Cancer (IARC), in Lyon, France upgraded styrene's classification to a "possible" human carcinogen. This action has been disputed by many scientists because it was not based on new cancer data, but resulted from changes in the criteria for IARC classifications. In a subsequent reviews in 1994 and 2002, IARC chose to maintain its classification for styrene. SIRC feels the significant amount of available scientific data indicates this classification is not warranted, and continues to address IARC's decision. It is important to note that IARC's charter stresses that their classifications are for hazard identification only - not to determine the risk of a given substance - and should not be used for regulatory purposes.

Are there any alternatives for styrene?

No other material can provide the same performance characteristics, quality, and cost-effectiveness of styrene. For example, by using styrene, boats are more structurally sound, packaging is more sanitary and less costly, automobiles have lighter components making them more fuel-efficient, and building insulation quality has greatly improved, helping to cut energy costs.

What is the Styrene Information and Research Center (SIRC)?

SIRC is a non-profit organization established in 1987 by companies involved in the manufacture or use of styrene. SIRC's mission is to evaluate existing data on potential health effects of styrene, and develop additional data where it is needed. SIRC has gained worldwide recognition as a source for information on styrene, thus helping to ensure that employee and public health is fully protected, and that regulatory legislation is based on sound science.

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